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ラット舌を支配する三叉神経節ニューロンでの transient receptor potential vanilloid 1 と anoctamin 1 の発現

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Expression of transient receptor potential vanilloid 1 and anoctamin 1 in rat trigeminal ganglion neurons innervating the tongue

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Abstract

Transient receptor potential vanilloid 1 (TRPV1) is a polymodal sensor that is activated by heat (>43 °C), acid, or capsaicin, the pungent ingredient of hot peppers. Reports that mice lacking TRPV1 display heat avoidance behaviors and TRPV1-negative neurons respond to heat suggest that an additional heat sensor is present. Anoctamin 1 (ANO1; also known as transmembrane protein 16A [TMEM16A]), is a component of Ca^{2+}-activated chloride channels (CaCCs), and has been recently identified as a heat sensor activated by temperatures over 44 °C. ANO1 is highly co-localized with TRPV1 in small-diameter dorsal root ganglion (DRG) neurons. The aim of the present study was to investigate co-expression of ANO1 and TRPV1 in rat trigeminal ganglion (TG) neurons innervating the tongue by using retrograde labeling and immunohistochemical techniques. Fluoro-gold (FG) retrograde labeling was used to identify the TG neurons innervating the anterior two thirds of the tongue; as expected, most labeling was detected in the mandibular division of the TGs. The FG-labeled TG neurons showed TRPV1 immunoreactivity (17.9%) and ANO1 immunoreactivity (13.7%), indicating that TRPV1- and ANO1-expressing neurons were present in the mandibular division of the TGs. Seventy-six percent of the ANO1-immunoreactive TG neurons were also immunoreactive for TRPV1; this co-expression was mainly detected in small- to medium-diameter TG neurons. The high degree of co-expression of TRPV1 and ANO1 suggests that cooperation between ANO1 and TRPV1 plays a role in the signaling pathways of nociceptive TG neurons.

出典：Brain Research Bulletin 106C:17-20 (2014)